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George Robert White Environmental Conservation Center
November 26, 2003
Occupying an Energy Efficient Office Building

The purpose of the report is to share with Mayor Thomas M. Menino's *Green Building Task Force* information about and performance of one of the City's greenest buildings: the George Robert White Environmental Conservation Center. This building was funded by the City of Boston's George Robert White Fund, is owned by the City, and is leased to Mass Audubon. It illustrates the tremendous possibilities of a successful public/private partnership. It serves as the base of operations for Mass Audubon's Boston Nature Center and contains an interpretative exhibit area, classrooms, resource learning center, and staff offices totaling 10,150 square feet. This is one of the nation's highest performing buildings and showcases a diverse variety of state-of-the-art energy efficient green technologies. This center, "the building that teaches" is designed, constructed, and maintained in a manner that protects and conserves the natural environment, offers healthy working environment, and in comparison to similarly sized buildings, uses 30 – 35 percent less energy. The center serves as a regional model for green design and construction and educates by example about environmentally sustainable design and building principles. These principles incorporated sustainable site location and innovative site planning; conservation of water, energy and other natural resources; use of energy efficiencies and renewable energy through a variety of features as solar hot water, geothermal climate control, photovoltaic shingles; conservation of materials and resources particularly through the use of local, recycled, or natural materials, and finally indoor air quality.

The Boston Nature Center is a community based education center and wildlife sanctuary. Its all-inclusive programs are offered both on-site and off-site and often occur with an array of collaborators and partners. Interactive exhibits and community programs integrated in a season theme provide the focus and opportunities to learn and teach about the natural world and understand how it works. This past year, BNC hosted over 10,000 visitors and program participants.

Green Building Technologies: Highlights of the center's many green technologies and techniques include the following features. The geothermal well is located 1,100 feet below grade pumping water with an ambient temperature of 55 degrees up through the building to supply energy the building's twelve heat pumps. Photovoltaic (PV) shingles convert the sun's energy into electricity that is then directly used in the center. These shingles produce electricity without burning fossil fuels, without producing any pollution, and do not deplete natural resources. A Data Acquisition System monitors the output of the PV system as well as related weather data including temperature, wind speed, and solar irradiance. Electric lighting components are designed for optimal efficiency through dimming and

occupancy sensors including lighting fixtures with photocells for automatic day lighting, as well as the use of clerestory windows and high-performance glass windows which are filled with argon gas. The wood shingles, trim and framing originated from a certified sustainable forestry operations with structural beams made of parallel strand lumber (PSL) fibers on the outermost edges of a log which is often discarded.

The paints used throughout the building are low-odor, low volatile organic compounds, formaldehyde free interior and 100 percent acrylic.

One Year Experience: This past year proved to be an excellent test to the energy efficient climate control system. With an unusually harsh winter followed by a brutally hot (early) summer, the geothermal system provided adequate heating and cooling without incident. While the system appears to need a longer time to reach occupancy temperatures, it provided consistent climate and optimal human comfort. The overall indoor air quality is excellent due, in part, to the low volatile carpeting and paint. While we continue to monitor the overall energy use of the building, the building operates with electricity as the only utility and uses approximately 8,000 to 12,000 kilowatt-hours on a monthly basis. This use appears to be consistent with the projections offered by Steven Winter Associates, Inc through its summary results of an Energy Modeling Study.

The staff members continue to learn to learn best operating practices to optimize the building's energy efficiencies, such as setting the twelve climate control zones at an adequate temperature, maximizing the use of optimal solar lighting, setting the light timing devices to only operate when the room is being used among others. Maintenance of the systems is equally important. Service contracts are now in place to ensure that air filters are replaced quarterly and that the systems are operating as efficiently as possible. Overall, the experience is overwhelming positive in this green building. Boston Nature Center hopes to continue to showcase the green building and sustainable construction to a wide spectrum of visitors from architects to school children. This building that teaches will continue to demonstrate how green technologies can be incorporated into any commercial, civic, or residential building. The GRWECC is not only a landmark in the City of Boston, but it is also a model for future developments, proving that buildings may be constructed with energy efficient materials and serve as functional, attractive structures.

If you are interested in learning more about the GRWECC or the environmental education work of the Boston Nature Center, please contact Julie Brandlen, Director at 617-983-8500 x-6901 or by e-mail jbrandlen@massaudubon.org